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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/504,813 | 02/16/2000 | Shuji Goto | P99,2486 | 6161 |

26263 7590 04/11/2006

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EXAMINER

CREPEAU, JONATHAN

| ART UNIT | PAPER NUMBER |
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1746

DATE MAILED: 04/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|--|------------------------------------|--|
| Office Action Summary | Application No. 09/504,813 | Applicant(s) GOTO ET AL. | |
| | Examiner Jonathan S. Crepeau | Art Unit 1746 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7,8 and 10-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7,8 and 10-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 7, 8, and 10-17. The rejections under 35 USC 112 and 103 are maintained herein (the amendatory language of 2/8/06 also being subject to the rejection under 112 first paragraph). As such, this action is made final.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 7, 8, and 10-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The independent claims recite a temperature of "about" 70 degrees C. There is not believed to be sufficient support for the term "about" in the originally filed application. This limitation encompasses temperatures slightly below 70 C that were not contemplated or envisioned by the originally-filed application. As such, its recitation is considered to introduce new matter into the application.

Further, the claims have been amended to recite that the duration of the heat treatment is “about ten minutes.” There is not believed to be sufficient support for the term “about,” as it modifies the term “ten minutes” in the application as originally filed. Page 19, line 2 of the specification discloses that the battery is allowed to stand in an oven “set to 70°C for 10 minutes.” It is the Examiner’s position that that this disclosure indicates a specific, not approximate, range to a skilled artisan, and therefore does not support recitations of “about ten minutes” or “about 70°C.” See *Eiselstein v. Frank*, 34 USPQ2d 1467 (CAFC 1995).

Claim Rejections - 35 USC § 103

4. Claims 7, 8, and 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gozdz et al (U.S. Patent 5,840,087) in view of Kumeuchi et al (U.S. Patent 6,156,080).

Gozdz et al. is directed to methods of making laminated batteries. As shown in Figure 6 and described in column 6, line 7 et seq., a negative electrode (63) is coated on both sides with electrolyte material (64). Two positive electrodes (43) are also coated on one side thereof with electrolyte and positioned on opposite sides of the negative electrode. The electrolyte-coated electrodes are then laminated “under reduced temperature and pressure conditions to effect a homogeneous, cohesive bond.” Thus, it appears that the bond of Gozdz et al. is “seamless” as recited in claims 7 and 17. Regarding claims 8, 12, and 16, the electrolyte layer contains swelling solvent, a matrix polymer (polyvinylidene fluoride), a lithium salt, and is gelled (see col. 3, line 5; Example 1).

The reference does not expressly teach the temperature (i.e., about 70 C) or duration (i.e., about ten minutes) of the lamination as recited claims 7, 10, and 17.

However, it is noted that Gozdz et al. teach a lamination temperature of “about 100°-120°C” at column 5, line 55. However, this temperature refers to the embodiment shown in Figure 4 of Gozdz (i.e., wherein separators are laminated to electrodes). As noted above, with reference to Figure 6 (the embodiment relevant to the instant claims), Gozdz teach that lamination is performed “under reduced temperature and pressure conditions.” As such, the artisan would possess sufficient skill to reduce the lamination temperature from the disclosed value of 100°C, thereby rendering the claimed value of “about 70°C” obvious. Further, the recitation of heat treatment “for about ten minutes” is also not considered to distinguish over Gozdz. The artisan would possess sufficient skill to manipulate the duration of the heat treatment in order to affect the characteristics of the resulting electrolyte bond while at the same time being mindful to not damage other battery components by excessive exposure to heat.

The reference further does not expressly teach that the electrode/electrolyte sheets are wound prior to heat-treatment or that both sides of the positive electrodes are coated with electrolyte, as recited in claims 7 and 17. The reference further does not expressly teach the electrolyte salt species recited in claim 11 or the solvent species as recited in claim 13. Additionally, the reference does not teach the limitations in claims 14 and 15 that the wound electrodes are inserted into a film pack and subsequently subjected to the heat-treatment.

The patent of Kumeuchi et al. is directed to methods of making electrode assemblies. In claim 47, the reference teaches a process comprising the steps of winding an electrode assembly,

inserting the assembly into a bag (film pack), sealing the bag, and simultaneously heating and compressing the wound electrode assembly. At column 7, line 64 et seq., the reference further teaches that the battery comprises an electrolyte solvent such as ethylene carbonate and a salt such as lithium hexafluorophosphate.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the process of Kumeuchi et al. to manufacture the battery of Gozdz et al., thereby resulting in the process of claims 7 and 17. In the abstract, Kumeuchi et al. teach the following:

trode sheet deposition. In accordance with the above-mentioned method, it is possible to increase a cell capacity per a unit volume in a prismatic cell, because the electrode sheet can be wound further half turn or a plurality of times. In addition, it is also possible to increase an efficiency in a charging and discharging cycle, because a gap between the electrodes and the insulating sheet is made smaller, and a space in a center of the wound electrode sheet deposition is also made smaller, ensuring uniform reaction in the electrode.

Accordingly, the artisan would be motivated by this disclosure to wind and heat the electrode assembly of Gozdz et al. according the process of Kumeuchi. To achieve the wound structure, the artisan would be sufficiently skilled to appropriately modify the structure of the battery shown in Figure 6 of Gozdz. For example, it would be obvious to use only one of the positive electrode elements so that that resulting battery has only one positive electrode and one negative electrode.

Regarding the limitation in claims 7 and 17 that both sides of both electrodes are coated with electrolyte, as noted above, the artisan would be sufficiently motivated to use a spirally-

wound configuration with the electrodes of Gozdz et al. In order to achieve such a configuration, the artisan would understand that an electrically insulating material would have to present on both sides of each electrode in order to prevent a short circuit. In view of Gozdz's teaching of a double-side coated negative electrode, the coating of electrically insulating, ion-conductive electrolyte material on both sides of the positive electrode would be an obvious way of eliminating such a short circuit. Upon heat-treating the wound assembly, all electrolyte layers would fuse together and form cohesive, seamless bonds.

It is further noted that Kumeuchi et al. teach a heating time of 30 minutes or less in claim 34 of the reference. Such disclosure further renders obvious the claimed time of 10 minutes. Additionally, the reference discusses at length the appropriate temperatures for the heating step. It is generally disclosed that the temperature should be equal to or less than the melting point of the separator material (col. 2, line 54). As such, the artisan would further be guided to use an appropriate temperature, e.g., 70 C, to heat the gel electrolyte material of Gozdz et al.

Regarding the species of electrolyte salts and solvents recited in claims 11 and 13, Kumeuchi et al. discloses that a number of these materials are suitable for use in its battery. As such, the artisan would be motivated to use these materials in the battery of Gozdz. See MPEP 2144.07.

Response to Arguments

5. Applicant's arguments filed February 8, 2006 have been fully considered but they are not persuasive. Applicants traverse the rejection under 35 USC 112, first paragraph, but no substantive traversal of the rejection is offered. Regarding the prior art rejection, Applicants state that "none of the cited references teach or disclose a method of manufacturing a solid-electrolyte battery having wounds subjected to heat treatment at about 70°C *for about 10 minutes.*" However, it is believed that the references, particularly the Kumeuchi reference, fairly suggest such a duration for the reasons set forth above. As such, the rejection is still believed to be proper.

Conclusion

6. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

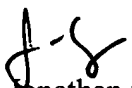
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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau
Primary Examiner
Art Unit 1746
April 6, 2006